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April 6, 2011

Mr. Ray Klimcsak  
U.S. Environmental Protection Agency – Region 2  
290 Broadway 19<sup>th</sup> Floor  
New York, New York 10007-1866

RE:

Bridgewood Lake and Railroad Track  
Revised Evaluation of Investigation Results and Proposal to Complete  
Soil and Sediment Delineation

*Administrative Order Index No. II CERCLA-02-99-2035*  
The Sherwin-Williams Company  
Gibbsboro, New Jersey

Dear Mr. Klimcsak:

This letter and attached figures and tables provides for the United States Environmental Protection Agency (EPA) the results of soil and sediment sampling conducted at Bridgewood Lake and the Railroad Track, and presents The Sherwin-Williams Company's (Sherwin-Williams) proposal to complete the remedial investigation of soil and sediment at these two locations. The proposal for additional site characterization incorporates the comments received from the EPA in its February 16, 2011 letter to Sherwin-Williams (received by Sherwin-Williams on February 21, 2011). In the February 16, 2011 letter, the EPA requested that a revised work plan be submitted within 30 days of receipt of the letter. Subsequently, Sherwin-Williams requested and received an extension to April 7, 2011.

This document provides a brief review of the soil and sediment sampling conducted at the Bridgewood Lake and Railroad Track areas and summarizes the results. Based on Sherwin-Williams' review of these results and the comments provided by the EPA, additional sediment sampling in Bridgewood Lake and soil sampling around the perimeter of Bridgewood Lake and in the Railroad Track area are proposed. Attached to this revised work plan text is a revised Figure 14 illustrating the locations at which additional sampling will be conducted after incorporation of the EPA and New Jersey Department of Environmental Protection (NJDEP) comments. Please note that only the revised text and revised Figure 14 are being submitted as the other Tables and Figures provided with the November 22, 2010 submission did not require any changes.

## Summary of Previous Investigations

On August 9, 2006, Sherwin-Williams submitted to the EPA the “*Evaluation of Strategic Sampling Results, Bridgewood Lake and the Rail Road Site*”. This interim report provided to EPA Sherwin-Williams’ analysis of the results of the Strategic Sampling Program conducted at Bridgewood Lake and the Railroad Track, and recommendations for additional characterization of sediment and soil.

The Strategic Sampling Program, conducted in 2005, consisted of:

1. Installation of 17 strategic soil borings at the Railroad Track and collection of one to four samples from each boring, depending upon the depth to groundwater, for a total of 45 samples.
2. Collection of 102 sediment samples from 10 transects, comprised of 58 sampling locations, in Bridgewood Lake.
3. Collection of 24 soil samples from 21 locations at the perimeter of Bridgewood Lake.
4. Collection of two rounds of surface water samples during wet and dry conditions from 10 locations in Bridgewood Lake. Pore water samples were also collected from two locations during the dry conditions event. During these sampling events, only unfiltered aqueous samples were collected.
5. Installation of two groundwater monitoring wells, and collection of two rounds of samples from the two wells.

All soil, sediment, surface water and groundwater samples were analyzed for Target Compound List (TCL) and Target Analyte List (TAL) parameters. During this phase of sampling, the samples were not screened with an X-Ray Fluorescence (XRF) unit.

The EPA provided a series of comments on the August 2006 data evaluation and sampling recommendations, and after responding to the EPA comments, a Phase 2 sampling program for Bridgewood Lake and the Railroad Track was submitted on December 5, 2007.

The Phase 2 sampling program included:

- Profiling the depth of the soft, organic-rich sediment layer at various locations throughout Bridgewood Lake;
- Installing borings into the coarser-grained sands and silts to vertically delineate constituents found in the soft, organic-rich sediment during the Strategic Sampling Program;

- Collecting supplemental sediment samples from Bridgewood Lake locations where laboratory analytical data were rejected;
- Conducting horizontal and vertical delineation of constituents in soil at the end of Bridgewood Lake transects; and
- Conducting supplemental soil sampling at 24 locations in the Railroad Track area to delineate the horizontal and vertical extent to which constituents were present in soil at concentrations greater than the RDCSRS.

Samples were screened using an XRF unit and, as necessary, additional samples were collected to complete the delineation. Samples that were submitted to the laboratory were analyzed for TAL Metals (plus cyanide).

Sediment sampling in Bridgewood Lake included installation of sediment cores to depths of up to 10 feet.

The Phase 2 sampling program was conducted from December 2007 through April 2008. XRF results were provided to the EPA during implementation of the soil sampling program at the Railroad Track, and conference calls were conducted to guide implementation of additional soil sampling along United States Avenue.

The results of the Phase 2 sampling program were made available on TeamLink, and Multimedia Electronic Data Deliverables (MEDD) containing the results of the Phase 2 sampling were submitted to the EPA. This letter provides to the EPA a formal evaluation of the combined Strategic Sampling and Phase 2 sampling programs that have been performed to date at Bridgewood Lake and the Railroad Track areas.

Subsequent to conducting the Phase 2 sampling program, the NJDEP conducted a rulemaking to adopt soil remediation standards. This rulemaking replaced the Residential Direct Contact Soil Cleanup Criteria (RDCSCC), which had been used as the criteria against which analytical results for soil were compared, with the Residential Direct Contact Soil Remediation Standards (RDCSRS). This evaluation uses the more recent RDCSRS.

Additionally, the NJDEP has expanded and revised the criteria for ecological evaluations since submission of the August 2006 evaluation of Strategic Sampling results. This evaluation uses the most recent 2009 NJDEP Ecological Screening Criteria (<http://www.nj.gov/dep/srp/guidance/ecoscreening/>).

This evaluation addresses only soil and sediment. Two rounds of surface water sampling have been conducted throughout Bridgewood Lake, as well as upstream of Bridgewood Lake in White Sand Branch and downstream of Bridgewood Lake in Hillard Creek. It is possible that Sherwin-Williams may elect to conduct additional surface water sampling to support risk assessment or feasibility study activities in the future, but at this time, the understanding of the distribution of constituents in surface water is

considered adequate. Groundwater sampling and evaluation is being conducted pursuant to separate scopes of work.

The following evaluation of the data is organized by media; Bridgewood Lake sediment is discussed first, followed by Bridgewood Lake and Railroad Track soil.

### **Bridgewood Lake Sediment**

Results of the Strategic Sampling (2005) and Phase 2 (2007-2008) investigations are presented on several figures:

- Figure 1 provides the sample locations from the various investigation phases conducted within Bridgewood Lake and the Railroad Track. A Sample Summary Table with the analytical methods presented in matrix format is provided in Table 1.
- Figure 2 provides cross-sectional views of the Bridgewood Lake transects summarizing arsenic, lead, total organic carbon (TOC) and percent solids for the sediment samples collected at each location. This figure provides a basis to assess whether the individual samples were collected from the soft, organic-rich sediment or the coarser-grained sand/silt underlying the soft, organic-rich sediment, or were a mixture of both sediment types.
- Figure 3 provides the arsenic and lead results from all sediment samples collected. Although other constituents have been found at levels greater than the NJDEP Ecological Screening Criteria (ESC), arsenic and lead are the most prevalent and are found at the highest concentrations with respect to their respective screening criteria. Figure 3 provides an understanding of the distribution of arsenic and lead, including the vertical extent of each constituent, in Bridgewood Lake sediment.
- Figures 4 and 5 provide all constituents found in Bridgewood Lake sediment at levels greater than the applicable ESC. It is to be noted that the 2005 Strategic Sampling included analyses for full-scan parameters, while the 2007-2008 Phase 2 sampling included analyses for TAL Metals (plus cyanide). This figure provides an indication of the extent to which any constituents may be present in sediment at levels greater than the ESC.
- Figures 6 and 7 provide both fixed-base laboratory analytical data and XRF field screening results for arsenic and lead. The combination of the XRF field screening results with the fixed-base laboratory analytical results provides a more complete understanding of the vertical profiles of arsenic and lead in Bridgewood Lake sediment.

The laboratory analytical results for sediment are presented in Table 2. The XRF results for arsenic and lead are presented in Table 3.

## Discussion of Results

The eastern shore of Bridgewood Lake begins just west of United States Avenue, where White Sand Branch flows into the lake. The lake extends to Clementon Road to the west, where water from the lake flows into Hilliard Creek via a culvert beneath Clementon Road. Bridgewood Lake is composed of two lobes connected by a narrow channel. The eastern lobe is approximately 300 feet long and 250 feet wide at its widest, and the western lobe is approximately 850 feet long and 350 feet wide at its widest location.

Bridgewood Lake is a relatively shallow lake (Figure 2), with water depths generally four feet or less. The eastern lobe is particularly shallow, with water depths generally two feet or less.

A layer of soft, organic-rich sediment is present throughout the lake. The thickness of this sediment ranges from approximately one foot to almost four feet, depending on the location in the lake. The thickest layer of the soft, organic-rich sediment is found in the eastern portion of the lake in the locations of BWDD0038 and BWDD0043. This material is generally characterized by TOC levels of 100,000 milligrams per kilogram (mg/kg), or 10% or greater, and percent solids that are typically less than 20 percent, although there is variability from these levels, and lower TOC levels and higher percent solids values are observed in some locations in the soft organic-rich sediment. The elevated TOC and low percent solids levels typical of the soft organic-rich sediment are observed in the majority of the sediment samples obtained from the AA-AB (0.0' – 0.5') interval, as illustrated on Figure 2.

Underlying the soft, organic-rich sediment are the native soils that consist of coarser-grained sands and silts. This material is generally characterized by TOC levels in the range of 3,000 mg/kg (0.3%) or less, and percent solids in the range of 80 percent. Examples of the low TOC and high percent solids typical of the coarser sands and silts include BWDD0033 AI-AJ and BWDD0051 AE-AF, among others. Some samples collected from the top 0.5' of the coarser-grained sands and silts possessed lower percent solids and/or higher TOC levels. These intermediate results may be a function of samples containing a mixture of the two sediment types.

Unlike Kirkwood Lake (see *“Response to USEPA Comments: Kirkwood Lake Investigation Report - Evaluation of Sampling Results and Supplemental Remedial Investigation Work Plan, Kirkwood Lake Sediment and Soil Sampling and Residential Property Soil Sampling”* dated June 11, 2010), there does not appear to be an intermediate transition zone between the soft organic-rich sediment and the coarser-grained sands and silts. As shown on Figure 2, samples containing TOC and percent solids values typical of the native coarser-grained sands and silts were obtained at depths of no more than 0.5' – 1.0' beneath the soft, organic-rich sediment.

Metals, polynuclear aromatic hydrocarbons (PAHs), pesticides and polychlorinated biphenyls (PCBs) were found in Bridgewood Lake sediment at levels greater than the NJDEP ESC (Figures 4 and 5). It was concluded following the Strategic Sampling that the metals were the constituents found most extensively at concentrations significantly

greater than their respective screening criteria, and the PAHs, pesticides and PCBs were not included in subsequent sampling events.

Based on the data that have been collected, it can be concluded that metals, particularly arsenic and lead, but also others such as cadmium, copper and zinc, are present in the soft, organic-rich sediment throughout Bridgewood Lake at concentrations greater than the ESC. Organic constituents, such as pesticides, PCBs, and PAHs are also present at levels greater than the ESC, but are not as pervasive and are found at lower levels in comparison to their screening criteria.

It can also be concluded that these constituents do not to any significant degree extend into the coarser-grained sands and silts. The analytical results for samples obtained exclusively from the underlying coarser-grained sands and silts (as characterized by percent solids at or above approximately 80% and TOC levels at or below approximately 3,000 mg/kg) support the conclusion that the concentrations of constituents in the coarser-grained sands and silts material achieve the applicable screening criteria. As highlighted on Figure 2, 14 samples contained TOC levels in the range of 3,000 mg/kg (or less) and percent solids of approximately 80% (or greater), supporting the conclusion that these samples were collected from the coarser-grained sands and silts. None of these samples contained arsenic or lead at a concentration greater than the ESC.

Based on the above, Sherwin-Williams concludes that no additional characterization of the soft organic-rich sediment is required for the purposes of understanding the nature and extent of contamination in this material. However, some additional sampling is needed to confirm the current conclusion that the metals and, to a lesser extent, PAHs, PCBs and pesticides present in the soft, organic-rich sediment are not, to any significant extent, present in the coarser-grained sands and silts. Additional sampling will also be conducted to replace rejected analytical data and to complete vertical delineation in one transect. Specifically:

- Only one sample, BWDD0011 AB-AC, located along BWL Transect 4, can be considered to be exclusively collected from the coarser-grained sands and silts based on the TOC and percent solids results. Further, the sample was collected from the location where the lake was shallowest and the soft organic-rich sediment was thinnest. Sherwin-Williams is proposing to return to BWL Transect 4 and collect samples from the coarser-grained sands and silts in two locations, BWDD0009 and BWDD0013. As shown on Figure 2, BWDD0009 is located to the north of BWDD0011, and BWDD0013 is located to the south. Both locations are in deeper portions of the lake where the soft organic-rich sediment is thicker, and both contained elevated levels of arsenic and lead in the deepest samples collected.
- Sample location BWDD0020, located along BWL Transect 7, contained arsenic at 22.9 mg/kg in the deepest sample (2.5' – 3.0'), and had TOC and percent solids levels that support a conclusion that the sample contained a mixture of soft, organic-rich sediment and deeper coarser-grained sands and silts.

Sherwin-Williams will return to BWDD0020 and conduct additional sampling of the coarser-grained sands and silts. Additional sampling along BWL Transect 7 is not proposed because the deepest samples collected from the soft, organic-rich sediment or from a mixture of soft, organic-rich sediment and coarser-grained sands and silts at locations BWDD0015, BWDD0021, BWDD0022 and BWDD0023 achieved vertical delineation for arsenic and lead. Additionally, the deepest samples in BWDD0016, BWDD0018, and BWDD0019 all approached vertical delineation for arsenic and lead.

- Sample location BWDD0029, located along BWL Transect 10, contained arsenic at 128 mg/kg and lead at 310 mg/kg in the deepest sample (1.5' – 2.0'). Additional sampling of the coarser-grained sands and silts will be conducted at this location. No additional sampling at BWL Transect 10 is proposed because vertical delineation was achieved in both samples collected from the coarser-grained sands and silts, BWDD0028 AD-AE and BWDD0030 AE-AF, and in two samples collected from the soft, organic-rich sediment, BWDD0025 AF-AG and BWDD0026 AD-AE. Additionally, the deepest samples collected from the soft, organic-rich sediment at locations BWDD0024 and BWDD0027 approached vertical delineation for arsenic and lead.
- Sample location BWDD0040, located along BWL Transect 16, contained arsenic at 87.8 mg/kg and lead at 656 mg/kg in the deepest sample (1.0' – 1.5') collected from the soft, organic-rich sediment. Additional sampling of the coarser-grained sands and silts will be conducted in this location. No additional sampling is proposed along BWL Transect 16 because vertical delineation was achieved in both samples collected from the coarser-grained sands and silts, BWDD0037 AC-AD and BWDD0039 AE-AF, and approached delineation in the deepest sample collected from the soft organic-rich sediment at location BWDD0038 (arsenic at 8 mg/kg and lead at 43.2 mg/kg in the 4.0' – 4.5' interval).
- Only the southernmost sample along BWL Transect 19, BWDD046 AE-AF, can be considered to be collected exclusively from the coarser-grained sands and silts based on the TOC and percent solids results. At other sampling locations in the middle of BWL Transect 19, the deeper samples, obtained from the soft organic-rich sediment, contained arsenic and/or lead at concentrations greater than the screening criteria. Sherwin-Williams will return to location BWDD0043, where sample BWDD0043 AI-AJ contained both arsenic and lead at a level greater than screening criteria.
- Sample location BWDD0049, located along BWL20, contained arsenic at 78.5 mg/kg and lead at 570 mg/kg in the sample obtained from the 0.5' – 1.0' interval in the soft, organic-rich sediment. Additional sampling of the coarser-grained sands and silts will be conducted at this location. Vertical delineation was achieved in two samples, BWDD0047 AG-AH and BWDD0051 AE-AF, collected from the coarser-grained sands and silts along this transect, and approached at location BWDD0048 (arsenic at 9.8 mg/kg at the 2.5' – 3.0' interval).

- Lead results were rejected in samples BWDD0001 AA-AB and BWDD0003 AA-AB, located in BWL Transect 1. Also, the deeper sediment sample collected from BWDD0002 did not achieve the screening criteria for lead. Therefore, Sherwin-Williams will return to BWDD0001 and BWDD0003 to collect samples from the AA-AB (0.0' – 0.5') interval to replace the rejected analytical results. Also, further sampling will be conducted at location BWDD0002 to vertically delineate constituents along BWL Transect 1.

Sherwin-Williams has reviewed the results from BWL transects 13, 14 and 21 and has concluded that adequate data are available along other transects to provide an understanding of the vertical distribution of constituents. Specifically:

- BWL Transect 13. Vertical delineation was achieved in all three boring locations along this transect.
- BWL Transect 14. Vertical delineation was achieved in two of the three borings installed along this transect. At the one location where vertical delineation was not achieved, BWDD0035, it was approached (arsenic at 12.2 mg/kg and lead at 31.8 mg/kg in the 3.0' – 3.5' interval).
- BWL Transect 21. Vertical delineation was achieved at BWDD0053, and the lead concentration in BWDD0052 (32.7 mg/kg) was only slightly greater than the screening criterion (31 mg/kg).

Additional sampling of the soft, organic-rich sediment or the coarser-grained sands and silts may be proposed in the future to support the risk assessment, feasibility study or remedy design, but Sherwin-Williams has concluded that the proposed scope of work will be adequate for purposes of understanding the nature and extent of constituents in sediment.

### **Bridgewood Lake and Railroad Track Soil**

The results of the Strategic Sampling and Phase 2 programs for soil are presented in several figures:

- Figure 8 presents all fixed-base laboratory analytical results for arsenic and lead. Arsenic and lead are the only two constituents regularly found in Bridgewood Lake or Railroad Track soil at levels greater than the RDCSRS;
- Figure 9 presents all fixed-base laboratory analytical results for any constituents found at a concentration greater than the RDCSRS in soil at Bridgewood Lake or the Railroad Track. As shown, only a few constituents in addition to arsenic and lead were found, and the levels approached the respective RDCSRS;
- Figure 10 is the key map, showing how Bridgewood Lake and the Railroad Track have been organized for the purpose of presenting both fixed-base laboratory analytical and XRF results for arsenic and lead;



- Figure 11 presents the arsenic and lead results for the Railroad Track, extending into United States Avenue;
- Figure 12 presents the arsenic and lead results for the Horseshoe Area of Bridgewood Lake; and
- Figure 13 presents the arsenic and lead results for the majority of Bridgewood Lake, except for the Horseshoe Area, located at the eastern perimeter of the lake.

The laboratory analytical results for soil are presented in Table 4. The XRF results for arsenic and lead are presented in Table 5.

### Discussion of Results

Arsenic and lead are the only two constituents regularly found at levels greater than the RDCSRS (Figure 9). Antimony was found in one sample (BWSB0011-AA-AB) at a concentration of 32.3 mg/kg, as compared to the RDCSRS of 31 mg/kg. PAHs were found at locations BWSB0015 and RRSB0004, but again the levels were only slightly greater than the RDCSRS. Finally, PCBs were found at location RRSB0004 at a level slightly above the RDCSRS.

The Strategic Sampling and Phase 2 results document that constituents were not found at levels greater than the RDCSRS in the majority of sampling locations surrounding Bridgewood Lake. As shown on Figure 9, soil samples containing constituents at levels greater than the RDCSRS were almost exclusively limited to the eastern shore of Bridgewood Lake and the Railroad Track. The results for the perimeter of Bridgewood Lake other than the eastern shore, and the eastern shore/Railroad Track are discussed below.

### *Bridgewood Lake Perimeter Other than Eastern Shore*

There are three locations around the perimeter of Bridgewood Lake other than the eastern shore where one or more constituents were found at levels greater than the RDCSRS:

1. BWSB0009, located on the western shore of Bridgewood Lake along Clementon Road, near the outfall to Hilliard Creek;
2. BWSB0011, located along the southern shore of Bridgewood Lake, near the narrow channel separating the eastern segment of the lake from the western segment; and
3. BWSB0053, located along the southern shore of Bridgewood Lake, on the perimeter of the small marsh area.

BWSB0009 is horizontally delineated to the RDCSRS at locations BWSB0022, BWSB0023 and BWSB0024, and vertically delineated at 3.5' – 4.0', as shown on Figures 8 and 13. Additionally, BWSB0011 contained only antimony at a level (32.3 mg/kg) only slightly greater than the RDCSRS (31 mg/kg). Therefore, no further sampling is proposed for these locations.

However, BWSB0053 is neither vertically nor horizontally delineated, as shown on Figures 8 and 13. Therefore, additional sampling will be conducted to determine the vertical and horizontal extent of the arsenic and lead found in this location.

#### Eastern Shore and Railroad Track

As presented on Figures 8 and 12, arsenic and lead were found at concentrations greater than the RDCSRS in a number of locations along the eastern shore of Bridgewood Lake. Additionally, as shown on Figures 8 and 11, the arsenic and lead extended east and north into the Railroad Track.

The arsenic and lead found in soil on the eastern shore of Bridgewood Lake and in the Railroad Track were vertically delineated at depths extending to 6.0' – 6.5', although the majority of locations were vertically delineated at shallower depths. Vertical delineation was achieved throughout the eastern shore of Bridgewood Lake and the Railroad Track. Where individual locations were not vertically delineated, an adjacent location was vertically delineated. For example, although BSWB0039 was not vertically delineated for arsenic (28.6 mg/kg at 4.0' – 4.5'), adjacent location BSWB0015 was vertically delineated at 5.5' – 6.0'.

Arsenic and/or lead were not horizontally delineated in the following locations:

1. BWSB0015, located along the northeastern shore of Bridgewood Lake, contained arsenic and lead at levels greater than the RDCSRS at both the 0.0' – 0.5' and 3.5' – 4.0' intervals. Although horizontally delineated to the north at the 0.0' – 0.5' interval at location BWSB0040, BWSB0040 did not extend deep enough to delineate the 3.5' – 4.0' interval.
2. BWSB0041 and BWSB0042, located on the eastern shore of Bridgewood Lake, contained arsenic and lead at concentrations greater than the RDCSRS in the 0.0' – 0.5' intervals. Although delineated to the north at location RRSB0024, RRSB0024 is almost 80 feet from BWSB0041 and BWSB0042.
3. BWSB0043, located along the eastern shore of Bridgewood Lake, contained lead at a concentration greater than the RDCSRS in the 0.0' – 0.5' interval. It is horizontally delineated at RRSB0003 and RRSB0007.
4. RRSB0015, located in United States Avenue, where lead was found at a concentration (410 mg/kg) slightly greater than the RDCSRS (400 mg/kg).

5. RRSB0029, located on the eastern perimeter of the Railroad Track, along the side of United States Avenue, where both arsenic and lead were found at levels greater than the RDCSRS.
6. RRSB0032, located on the eastern perimeter of the Railroad Track, along the side of United States Avenue where lead was found at a concentration (410 mg/kg) slightly greater than the RDCSRS.
7. RRSB0033, one of the northernmost samples along the Railroad Track, had a reported analytical result of 612 mg/kg for lead and an XRF result for lead of 453 mg/kg. Additionally, the laboratory analytical result for lead was rejected.

RRSB0033 was one of several locations along the northern end of the Railroad Track where the lead results for the samples collected were rejected for lead. The other locations were RRSB0024 – RRSB0028, and RRSB0034. Based on the XRF results and the reported analytical results for these samples and the locations adjacent to these samples (see Figures 11 and 13), it has been concluded that sampling will be conducted at three locations, RRSB0027, RRSB0028 and RRSB0033, to document that horizontal delineation is complete to the north. Additional sampling is not proposed at locations RRSB0024 through RRSB0026:

- RRSB0024 and RRSB0025 are delineated approximately 15 feet to the north at location RRSB0005, in which neither arsenic nor lead was found at a concentration greater than the RDCSCC in either the 0' – 2 or 2.5' – 3' interval.
- RRSB0026 is located south of RRSB0033 and the additional sampling at and to the north of RRSB0033 will serve to provide delineation.
- RRSB0034 is located north of RRSB0027 and RRSB0028, and it is predicted that resampling of RRSB0027 and RSB0028 will provide delineation to the north.

Sherwin-Williams originally proposed additional sampling east of RRSB0029. Because of the relatively low concentrations of lead found in RRSB0015 and RRSB0032, it was concluded that no further delineation was needed to understand the extent of the lead in these locations. In addition, as noted in the EPA February 16, 2011 letter, there is also no ability to collect an additional sample east of RRSB0029 without sampling beneath U.S. Avenue. Therefore, no additional horizontal delineation of RRSB0029 will be conducted at this time.

The EPA February 16, 2011 letter included requests for soil sampling at other locations. These additional locations have been included in the scope of work discussed in the next section.

## Scope of Work to Complete Sediment and Soil Delineation

As discussed previously, both additional sediment and soil sampling is proposed. The following provides the scopes of work for both the sediment and soil sampling. The proposed sampling locations are presented on revised Figure 14.

### Sediment Sampling

Additional sediment sampling is proposed for the following locations:

1. BWL Transect 1 to: a) collect samples at locations BWDD0001 and BWDD0003 to replace lead data that were rejected; and b) vertically delineate constituents at location BWDD0002.
2. Locations BWDD0009 and BWDD0013, located along BWL Transect 4. In these locations, additional samples of the coarser-grained sands and silts will be collected to assess the vertical extent of constituents.
3. Location BWDD0020, located along BWL Transect 7. Additional sampling of the coarser-grained sands and silts will be conducted at this location.
4. Location BWDD0029, located along BWL Transect 10. Additional sampling of the coarser-grained sands and silts will be conducted at this location.
5. Location BWDD0040, located along BWL Transect 16. Additional sampling of the coarser-grained sands and silts will be conducted at this location.
6. Location BWDD0043, located along BWL Transect 19. Additional sampling of the coarser-grained sands and silts will be conducted at this location.
7. Location BWDD0049, located along BWL Transect 20. Additional sampling of the coarser-grained sands and silts will be conducted at this location.

### Vertical Delineation in Coarser-Grained Sands and Silts

At the locations identified above at which additional characterization of the coarser-grained sands and silts will be conducted, the initial step will be to estimate the thickness of the soft, organic-rich sediment layer prior to sampling. Based on the probing that will be conducted prior to sampling and the depth to the coarser-grained sands and silts measured during the previous sampling events (see Figure 2), the depth at which the sampling will begin at each location will be determined. For example, as shown on Figure 2, it is predicted from previous sampling events that the coarser-grained sands and silts will be encountered at an approximate depth of 2.0' – 2.5' at location BWDD0009. Probing will be conducted prior to beginning sampling at this location to confirm the expected depth of the coarser-grained sands and silts.

At each location, the core barrel will be extended to the top of the coarser-grained sands and silts, as determined from the probing. A five-foot core of the sediment below

the soft, organic rich sediment will be obtained to ensure that a four-foot core of coarser-grained sands and silts is obtained. The field team will identify the depth at which the coarser-grained sands and silts are encountered. Based on previous experience at Bridgewood Lake, there is a relatively clear distinction between the darker soft organic-rich sediment and the lighter-colored coarser-grained sands and silts. Samples will be obtained from the 0.0' – 0.5', 1.5' – 2.0' and 3.5' – 4.0' intervals of the coarser-grained sands and silts.

No XRF screening of the sediment samples will be conducted. All sediment samples collected will be submitted to the laboratory and will be analyzed for TAL Metals, TOC, pH, grain size and percent solids.

#### BWL Transect 1

A five-foot core will be collected at locations BWDD0001 and BWDD0003. Samples will be obtained from the 0.0' – 0.5', 1.5' – 2.0', 3.5' – 4.0' and 4.5' – 5.0' intervals at both locations. The samples will be analyzed for TAL Metals, TOC, pH, grain size and percent solids. Based on the observations obtained during the 2005 and 2007 sediment sampling, it is predicted that the soft, organic-rich sediment layer will be relatively thin at both locations, so the five-foot core is expected to provide both the sample of the soft, organic-rich sediment needed to replace the rejected results, and the four feet of coarser grained sands and silts requested by the EPA in the February 16, 2011 letter.

#### Soil Sampling

Additional soil sampling is proposed in the following locations:

1. BWSB0053, located along the southern shore of Bridgewood Lake, where additional sampling is needed to vertically and horizontally delineate the arsenic and lead found in the 0.0' – 0.5' interval;
2. BWSB0043, located on the eastern shore of Bridgewood Lake, where additional sampling is needed to vertically delineate the lead found in the 0.0' – 0.5' interval;
3. North of BWSB0041 and BWSB0042, on the northeastern shore of Bridgewood Lake, where a sample will be collected to better define the horizontal extent of arsenic and lead found at levels greater than the RDCSRS at the 0.0' – 0.5' interval;
4. North of BWSB0015 at location BWSB0040, on the northeastern shore of Bridgewood Lake, to delineate arsenic and lead found at the 3.5' – 4.0' interval;
5. Approximately 50 feet west of location RRSB0029, located at the southern end of the Railroad Track, where additional sampling will be conducted in the former rail bed at EPA's request. Samples will be screened to at least 4.5' below grade;
6. RRSB0027, RRSB0028 and RRSB0033, all located on the northern end of the Railroad Track, where additional sampling is needed to replace the rejected lead

results at the northern end of the Railroad Track and to complete horizontal delineation to the north.

7. In the northeast corner of Bridgewood Lake, along the shoreline approximately mid-way between RRSB0004 and BWSB0016, where an additional boring will be installed at the request of the NJDEP; and
8. Two locations west of the railroad track and east of previous sampling locations BWSB0055 and BWSB0056, where additional sampling will be conducted at the request of the NJDEP.

The scope of work for each location is discussed below.

#### Horizontal and Vertical Delineation at BWSB0053

An additional sample will be obtained from the 2.0' – 2.5' interval and field-screened with the XRF. If the XRF screening finds neither arsenic nor lead at a concentration greater than the RDCSRS, the sample will be collected for laboratory analysis. If arsenic or lead are found at a concentration greater than the RDCSRS, a sample will be collected from the next two-foot interval (4.0' – 4.5') and field-screened with the XRF. This will continue until neither arsenic nor lead is found at a level greater than the RDCSRS. All samples will be collected and analyzed for TAL Metals.

Delineation borings will be installed at locations approximately 10 feet on each side (east, west and south) of BWSB0053. Samples will be collected from the 0.0' – 0.5' interval and any other depth interval(s) at which the XRF screening finds arsenic or lead at a concentration greater than the RDCSRS at location BWSB0053. If the XRF screening results of the deepest sample in any delineation boring finds arsenic or lead at a concentration greater than the RDCSRS, a sample will be collected from the next deeper two-foot interval, and that sample will also be screened with the XRF. This will continue until neither arsenic nor lead is found at a concentration greater than the RDCSRS. All samples collected will be analyzed for TAL Metals.

If the XRF screening finds arsenic or lead at a concentration greater than the RDCSRS in any sample from a delineation boring, a step-out boring will be installed at another ten foot distance from the original delineation boring(s). The step-out boring will be installed to the depth at which the XRF screening showed vertical delineation to be achieved in the original delineation boring. For example, if the delineation boring finds arsenic or lead at a level greater than the RDCSRS in only the 0.0' – 0.5' interval, the step-out boring would be installed to the 2.0' – 2.5' interval. The samples will be screened with the XRF unit.

If the XRF screening finds neither arsenic nor lead at a level greater than the RDCSRS, the samples will be collected and submitted to the laboratory for TAL Metals analysis. If, however, arsenic or lead is found at a level greater than the RDCSRS, another step-out boring will be installed, and the above XRF screening and sampling procedures will be followed until the furthest step-out boring is found to contain neither arsenic nor lead at a level greater than the RDCSRS.

Vertical Sampling at BWSB0043

A sample will be collected from the 2.0' – 2.5' interval and screened with the XRF unit. If neither arsenic nor lead is found at a level greater than the RDCSRS, the sample will be submitted to the laboratory and analyzed for TAL Metals. If arsenic or lead is found at a level greater than the RDCSRS, a sample will be collected from the next deeper two-foot interval (4.0' – 4.5') and screened with the XRF. This will continue until neither arsenic nor lead is found at a concentration greater than the RDCSRS. All samples submitted to the laboratory will be analyzed for TAL Metals.

Note that no additional step-out borings are proposed in this location. Borings installed to the north, south and east were completed to depths of up to 7.0' – 7.5' and provide horizontal delineation at depth.

New Boring North of BWSB0041 and BWSB0042

A sample will be collected from the 0.0' – 0.5' interval at a location approximately midway between BWSB0041 and BWSB0024. The sample will be field-screened with the XRF. If neither arsenic nor lead is found at a level greater than the RDCSRS, the sample will be analyzed for TAL Metals.

If arsenic or lead is found at a level greater than the RDCSRS, additional horizontal and vertical sampling will be conducted:

- The boring will be extended and additional samples will be collected from the bottom of subsequent two-foot intervals until neither lead nor arsenic is found at a concentration greater than the RDCSRS. All samples will be analyzed for TAL Metals.
- A step-out boring will be installed ten feet north of the initial delineation boring. The boring will be completed to the depth at which vertical delineation was achieved in the initial delineation boring. If, for example, the sample that contained neither arsenic nor lead in the delineation boring was obtained from the 4.5' – 5.0' interval, the step-out boring will be completed to the 4.5' – 5.0' depth. Samples will be collected at two-foot intervals from the 0.0' – 0.5' interval to the bottom of the boring. All samples will be screened with the XRF. If neither arsenic nor lead is found at a level greater than the RDCSRS, the samples will be collected and analyzed for TAL Metals. If one or more intervals contain arsenic or lead at a level greater than the RDCSRS, additional vertical and horizontal screening and sampling will be conducted.

New Boring North of BWSB0015 at location BWSB0040

A boring will be installed to a depth of four feet at former location BWSB0040, and a sample will be collected from the 3.5' – 4.0' interval for the purpose of delineating the arsenic and lead found at this depth at location BWSB0015. The sample will be

screened with the XRF, and if neither arsenic nor lead is found at a concentration greater than the RDCSRS, the sample will be collected and analyzed for TAL Metals.

If the sample contains arsenic or lead at a level greater than the RDCSRS, both additional vertical and horizontal sampling will be conducted:

- The boring will be extended and additional samples will be collected from the bottom of subsequent two-foot intervals until neither lead nor arsenic is found at a concentration greater than the RDCSRS. All samples will be analyzed for TAL Metals.
- A step-out boring will be installed ten feet north of BWSB0040. The boring will be completed to the depth at which vertical delineation was achieved in BWSB0040. If, for example, the sample that contained neither arsenic nor lead in BWSB0040 was obtained from the 5.5' – 6.0' interval, the step-out boring will be completed to the 5.5' – 6.0' depth. Samples will be collected at two-foot intervals from the 0.0' – 0.5' interval to the bottom of the boring. All samples will be screened with the XRF. If neither arsenic nor lead is found at a level greater than the RDCSRS, the samples will be collected and analyzed for TAL Metals. If one or more intervals contain arsenic or lead at a level greater than the RDCSRS, additional vertical and horizontal sampling will be conducted.

#### New Boring West of RRSB0029

A boring will be installed west of RRSB0029 in the rail bed. A five-foot core will be collected and the core will be analyzed with the XRF at the 0.0' – 0.5', 2.0 – 2.5', 3.5' – 4.0' and 4.5' – 5.0' intervals. If neither arsenic nor lead is found at levels greater than the RDCSCC, the sample from the 0.0' – 0.5' and 4.5' – 5.0' intervals will be collected and analyzed at the laboratory for TAL Metals.

If arsenic or lead is found at a concentration greater than the RDCSRS in any interval, the sample from that interval and the interval immediately beneath it will be collected for analysis. If the arsenic or lead is found in the 4.5' – 5.0' interval, another core will be obtained and a sample will be collected from the 5.5' – 6.0' interval. This sample will be analyzed with the XRF and if neither arsenic nor lead is found at a concentration greater than the RDCSRS, it will be collected along with the sample from the 4.5' – 5.0' interval and analyzed for TAL Metals.

Additional samples will be collected from the bottom six inches of each subsequent two-foot interval (7.5' – 8.0', 9.5' – 10.0') until XRF analysis finds neither arsenic nor lead at a level greater than the RDCSRS. The bottom two intervals (the clean interval and the one immediately above it) and the sample from the 4.5' – 5.0' interval will be collected and analyzed for TAL Metals.

Note that no horizontal step-out borings are proposed. Previous sampling has provided data surrounding the location of the new boring.



Resampling of RRSB0027, RRSB0028 and RRSB0033

A boring will be installed at the previous locations of RRSB0027, RRSB0028 and RRSB0033. Samples will be collected from the 0.0' – 0.5' and 2.0' – 2.5' intervals. The samples will be screened with the XRF. If arsenic or lead is not found at a concentration greater than the RDCSRS, the samples will be submitted to the laboratory and analyzed for TAL Metals. If lead or arsenic is found at a concentration greater than the RDCSRS in the sample from the 2.0' – 2.5' interval at any location, a sample will be collected from the next deepest 2-foot interval (4.0' – 4.5') at that location. This will continue until neither arsenic nor lead is found at a concentration greater than the RDCSRS.

If the XRF screening finds arsenic or lead at a concentration greater than the RDCSRS in any sample at any of the three locations, a step-out boring will be installed ten feet to the north of the original location. The step-out boring will be installed to the depth at which the XRF screening showed vertical delineation to be achieved in the original delineation boring. For example, if the arsenic or lead is found at a level greater than the RDCSRS in RRSB0033 in only the 0.0' – 0.5' interval, the step-out boring would be installed to the 2.0' – 2.5' interval. The samples will be screened with the XRF unit.

If the XRF screening finds neither arsenic nor lead at a level greater than the RDCSRS, the samples will be submitted to the laboratory and analyzed for TAL Metals. If, however, arsenic or lead is found at a level greater than the RDCSRS, another step-out boring will be installed, and the above XRF screening and sampling procedures will be followed until the furthest step-out boring is found to contain neither arsenic nor lead at a level greater than the RDCSRS.

New Boring on Northeastern Corner of Bridgewood Lake Shoreline

As requested by EPA and the NJDEP, an additional boring will be installed along the shoreline of Bridgewood Lake, approximately mid-way between RRSB0004 and BWSB0016.

Samples will be collected from the 0.0' – 0.5' and 2.0' – 2.5' intervals. The samples will be screened with the XRF. If arsenic or lead is not found at a concentration greater than the RDCSRS, the samples will be submitted to the laboratory and analyzed for TAL Metals. If lead or arsenic is found at a concentration greater than the RDCSRS in the sample from the 2.0' – 2.5' interval at any location, a sample will be collected from the next deepest 2-foot interval (4.0' – 4.5') at that location. This will continue until neither arsenic nor lead is found at a concentration greater than the RDCSRS.

No step-out borings are proposed at this location. Previous sampling has provided data in all directions surrounding the new boring.

### New Borings in Northern Portion of Railroad Bed

As requested by the EPA and NJDEP, two borings will be installed in the northern portion of the railroad bed, east of BWSB0055 and BWSB0056. The protocol used for the boring requested by EPA west of RRSB0029 will be used in these locations.

Borings will be installed in the railroad bed, as requested. A five-foot core will be collected from each location, and the core will be analyzed with the XRF at the 0.0' – 0.5', 2.0 – 2.5', 3.5' – 4.0' and 4.5' – 5.0' intervals. If neither arsenic nor lead is found at levels greater than the RDCSCC, the sample from the 0.0' – 0.5' interval will be collected and analyzed at the laboratory for TAL Metals.

If arsenic or lead is found at a concentration greater than the RDCSRS in any interval, the sample from that interval and the interval immediately beneath it will be collected for analysis. If the arsenic or lead is found in the 4.5' – 5.0' interval, another core will be obtained and a sample will be collected from the 5.5' – 6.0' interval. This sample will be analyzed with the XRF and if neither arsenic nor lead is found at a concentration greater than the RDCSRS, it will be collected along with the sample from the 4.5' – 5.0' interval and analyzed for TAL Metals.

Additional samples will be collected from the bottom six inches of each subsequent two-foot interval (7.5' – 8.0', 9.5' – 10.0') until XRF analysis finds neither arsenic nor lead at a level greater than the RDCSRS. The bottom two intervals (the clean interval and the one immediately above it) and the sample from the 4.5' – 5.0' interval will be collected and analyzed for TAL Metals.

Note that no horizontal step-out borings are proposed. Previous sampling has provided data surrounding the location of the new boring.

### **Summary**

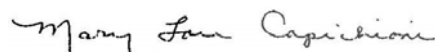
As discussed in this data evaluation, the data from Bridgewood Lake are adequate for purposes of understanding the distribution of constituents in the soft organic-rich sediment, and the current data support a conclusion that the extent of these constituents is limited to the soft organic-rich sediment. In general, metals, including arsenic, copper, lead and zinc, are found at concentrations greater than the NJDEP ESC throughout the soft, organic-rich sediment layer, although in several locations, the deeper samples from the soft organic-rich sediment did not contain constituents at concentrations greater than the ESC. Additionally, organic constituents, including PAHs, PCBs and pesticides are found in the soft, organic-rich sediment layer at concentrations greater than the ESC, but are less prevalent and are at lower concentrations with respect to the ESC.

Additional sampling of the sediment is proposed to better evaluate the vertical distribution of constituents in sediment, and to replace rejected analytical results. The locations at which the additional sampling will be conducted have been modified to include locations requested by the EPA in its February 16, 2011 letter.

Arsenic and lead are the only constituents regularly found in soil around Bridgewood Lake or the Railroad Track. The Strategic Sampling and Phase 2 soil data support a conclusion that constituents are not present in soil at concentrations greater than the RDCSRS around the majority of Bridgewood Lake. Where found at levels greater than the RDCSRS, they are primarily found along the eastern shore. In general, the arsenic and lead are vertically and horizontally delineated, but additional sampling is needed in a small number of locations to complete the delineation. Additional sampling is proposed for this purpose. The soil sampling locations have also been modified to include additional locations requested by the EPA in its February 16, 2011 letter.

Should you have any other recommendations or if you have any questions or comments, please do not hesitate to contact me at (216) 566-1794 or via e-mail at [mlcapichioni@sherwin.com](mailto:mlcapichioni@sherwin.com).

Sincerely,

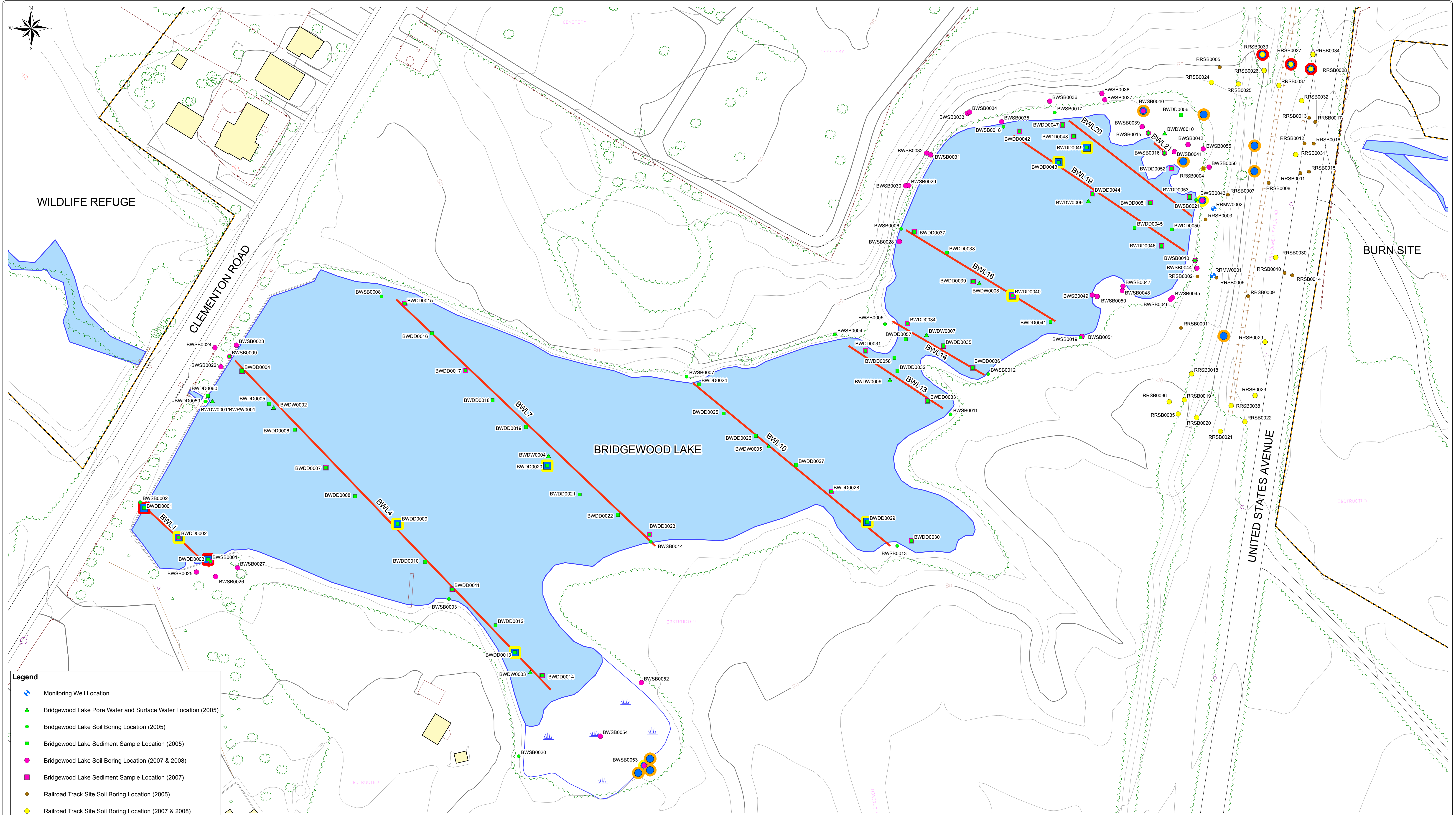


Mary Lou Capichioni  
Director Remediation Services

Attachment

cc: J. Josephson, EPA (New York)  
W. Sy, EPA (Edison)  
L. Vogel, NJDEP (4 copies)  
P. Parvis, HDR  
J. Gerulis, Sherwin-Williams (w/o enclosures)  
A. Danzig, Sherwin-Williams (w/o enclosures)  
S. Peticolas, Gibbons, Del Deo, Dolan, Griffinger, & Vecchione (w/o enclosures)  
H. Martin, ELM  
R. Mattuck, Gradient  
S. Jones, Weston Solutions  
S. Clough, Weston Solutions  
A. Fischer, Weston Solutions





**Legend**

Monitoring Well Location

Bridgewood Lake Pore Water and Surface Water Location (2005)

Bridgewood Lake Soil Boring Location (2005)

Bridgewood Lake Sediment Sample Location (2005)

Bridgewood Lake Soil Boring Location (2007 & 2008)

Bridgewood Lake Sediment Sample Location (2007)

Railroad Track Site Soil Boring Location (2005)

Railroad Track Site Soil Boring Location (2007 & 2008)

Proposed Sediment Sample Location For Vertical Delineation

Proposed Sediment Sample Location To Be Resampled

Proposed Soil Boring Location For Horizontal Delineation

Proposed Soil Boring Location For Vertical Delineation

Proposed Soil Boring Location To Be Resampled

Transect Location

Weston Solutions, Inc.  
205 Campus Drive Edison, New Jersey 08837-3939  
TEL: (732) 417-5800 Fax: (732) 417-5801  
<http://www.westonsolutions.com>

REPORT DATE: APRIL 2011	PROJECT MANAGER: S. Jones
DRAWING: PATH: 09081_BWL_RR_Sample_Loc_101410.mxd L:\SHERWIN\GIS\MXD\0210_BWL_RR	CHECKED BY: A. Fischer
REVISION No. 1 Revised 4/5/2011	CONTRACT No. DELIVERY ORDER No.
WORK ORDER No. 20076.022.080.0005	DRAWN/MODIFIED BY: J. Lynes DATE CREATED: 10/14/2010

CLIENT NAME: The Sherwin-Williams Company
PROJECT NAME: Sherwin-Williams Gibbsboro Remedial Investigation

DRAWING TITLE: BRIDGEWOOD LAKE AND RAILROAD TRACK PROPOSED SAMPLE LOCATION MAP		
FIGURE: 14	SCALE: 1" = 50'	DATE: 4/5/2011